Pending Claims

The following listing of claims replaces all prior versions and listings of claims in this application:

Listing of Claims

1. (original) A packaging film comprising:

an antifog film; and

a printed image on the antifog film, the image comprising a cured ink selected from the group consisting of radiation-cured inks and thermoset inks.

2. (original) The film of claim 1 wherein the printed image comprises an amount of the cured ink effective to reduce the tendency of the antifog film to form a ghost condensate image of the printed image after the film has been rolled and unrolled.

3. (original) The film of claim 1 wherein:

the antifog film has first and second sides, at least a portion of the first side of the film having an antifogging characteristic; and

the printed image is on at least a portion of the second side of the film, the printed image comprising an effective amount of the cured ink to reduce ghosting after the film has been rolled and unrolled.

4. (original) The film of claim 1 wherein the printed image has an outer surface opposite the antifog film and the outer surface comprises at least a portion of the cured ink.

5. (original) The film of claim 1 wherein:

the antifog film has first and second sides and comprises a coating of antifog agent on at least a portion of the first side of the film; and

the printed image is on at least a portion of the second side of the film.

6. (original) The film of claim 1 wherein the antifog film comprises an antifog agent dispersed in at least a portion of the film.

7. (original) The film of claim 1 wherein the antifog film has a total free shrink at 185°F of at least about 5%.

8. (original) The film of claim 1 wherein the cured ink comprises a radiation-cured ink.

9. (original) The film of claim 1 wherein the cured ink comprises an electron-beam cured ink.

10. (original) The film of claim 1 wherein the cured ink comprises an ultraviolet-light cured ink.

11. (original) The film of claim 1 wherein the cured ink comprises a thermoset ink.

12. (original) The film of claim 1 wherein the cured ink is selected from the group consisting of a cured one-component reactive ink and a cured multi-component reactive ink.

13. (original) The film of claim 1 where the cured ink comprises a cured two-component reactive ink.

14. (original) The film of claim 1 wherein the cured ink comprises a thermoset melamine-based ink.

15. (original) The film of claim 1 wherein the cured ink comprises a thermoset urethane-based ink.

16. (original) The film of claim 1 wherein the printed image further comprises a solvent-based ink.

17. (original) The film of claim 1 wherein the antifog film has an average thickness of less than about 3 mils.

18. (original) The film of claim 1 wherein the cured ink has an average gloss of at least about 40% measured in accordance with ASTM D 2457 (60° angle).

19. (original) The film of claim 1 wherein the printed image is formed at least in part by applying to the antifog film an ink selected from the group consisting of radiation-curable inks and thermoset inks and subsequently curing the ink to form the cured ink.

20. (original) The film of claim 1 wherein the printed image is formed at least in part by applying a radiation-curable ink to the antifog film and subsequently exposing the ink to an effective amount of radiation to cure the ink.

21. (original) The film of claim 20 wherein:

the radiation-curable ink comprises one or more reactants having reactive sites; and

the radiation exposure comprises electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

22. (original) The film of claim 20 wherein the radiation exposure comprises electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

23. (original) The film of claim 20 wherein the radiation-curable ink includes less than 20 % monofunctional monomer based on the weight of the radiation-curable ink.

24. (original) The film of claim 20 wherein the radiation-curable ink includes less than 20 % reactant diluent based on the weight of the radiation-curable ink.

25. (original) A packaged food product comprising:

a tray having a food storage side;

a food product resting on the food storage side of the tray; and

the film of claim 1 covering at least the food storage side of the tray.

26. (original) A method of packaging a moisture-containing food product comprising at least partially enclosing the moisture-containing food product within the film of claim 1.

27. (original) A packaging film comprising:

an antifog film;

a printed image on at least one side of the antifog film; and

an overprint varnish on at least a substantial portion of the printed image, the overprint varnish comprising a cured varnish selected from the group consisting of radiation-cured varnishes and thermoset varnishes.

28. (original) The film of claim 27 wherein the amount of the cured overprint varnish is effective to reduce the tendency of the antifog film to form a ghost condensate image of the printed image after the film has been rolled and unrolled.

29. (original) The film of claim 27 wherein:

the antifog film has first and second sides, at least a portion of the first side of the film having an antifogging characteristic;

the printed image is on at least a portion of the second side of the film; and

the overprint varnish comprises an effective amount of cured varnish to reduce ghosting.

30. (original) The film of claim 27 wherein the film comprises an antifog agent dispersed in at least a portion of the film.

31. (original) The film of claim 27 wherein the film comprises an antifog coating applied to the first side of the film.

32. (original) The film of claim 27 wherein the antifog film has a total free shrink at 185°F of at least about 5%.

33. (original) The film of claim 27 wherein the cured varnish comprises a radiation-cured varnish.

34. (original) The film of claim 27 wherein the cured varnish comprises an electron-beam cured varnish.

35. (original) The film of claim 27 wherein the cured varnish comprises an ultraviolet-light cured varnish.

36. (original) The film of claim 27 wherein the cured varnish comprises a thermoset varnish.

37. (original) The film of claim 27 wherein the cured varnish is selected from the group consisting of a cured one-component reactive varnish and a cured multi-component reactive varnish.

38. (original) The film of claim 27 where the cured varnish comprises a cured two-component reactive varnish.

39. (original) The film of claim 27 wherein the cured varnish comprises a thermoset melamine-based varnish.

40. (original) The film of claim 27 wherein the cured varnish comprises a thermoset urethane-based varnish.

41. (original) The film of claim 27 wherein the printed image comprises a solvent-based ink.

42. (original) The film of claim 27 wherein the printed image comprises a cured ink selected from the group consisting of radiation-cured inks and thermoset inks.

43. (original) The film of claim 27 wherein the antifog film has an average thickness of less than about 3 mils.

44. (original) The film of claim 27 wherein the cured varnish has an average gloss of at least about 40% measured in accordance with ASTM D 2457 (60° angle).

45. (original) The film of claim 27 wherein the cured varnish is formed at least in part by applying to the printed image a varnish selected from the group consisting of radiation-curable varnishes and thermoset varnishes and subsequently curing the varnish to form the cured varnish.

46. (original) The film of claim 27 wherein the cured varnish is formed at least in part by applying to the printed image a radiation-curable varnish and subsequently exposing the varnish to an effective amount of radiation to cure the varnish.

47. (original) The film of claim 46 wherein the radiation-curable varnish is cured by a free radical mechanism.

48. (original) The film of claim 46 wherein:

the radiation-curable varnish comprises one or more reactants having reactive sites; and

the radiation exposure comprises electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

49. (original) The film of claim 46 wherein the radiation exposure comprises electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

50. (original) The film of claim 46 wherein the radiation-curable varnish includes less than 20 % monofunctional monomer based on the weight of the radiation-curable varnish.

51. (original) The film of claim 46 wherein the radiation-curable varnish includes less than 20 % reactant diluent based on the weight of the radiation-curable varnish.

52. (original) A packaged food product comprising:

a tray having a food storage side;

a food product resting on the food storage side of the tray; and

the film of claim 27 covering at least the food storage side of the tray.

53. (original) A method of packaging a moisture-containing food product comprising at least partially enclosing the moisture-containing food product within the film of claim 27.

54. (original) A packaging film comprising:

an antifog film; and

a printed image on at least one side of the antifog film; and

an overprint varnish on at least a substantial portion of the printed image, the overprint varnish comprising a varnish selected from the group consisting of radiation-curable varnishes and thermoset varnishes.

55. (original) A method of reducing the tendency of ghosting in an antifog film, the method comprising:

printing an image on at least one side of an antifog film,

applying an overprint varnish over a substantial portion of the printed image, the overprint varnish comprising a varnish selected from the group consisting of radiation-curable varnishes and thermoset varnishes; and

subsequently curing the varnish.

56. (New) A method of forming the film of claim 19 comprising:

providing the antifog film;

applying to the antifog film a curable ink selected from the group consisting of radiation-curable inks and thermoset inks; and

subsequently curing the curable ink to form the cured ink.

57. (New) A method of forming the film of claim 20 comprising:

providing the antifog film;

applying to the antifog film a radiation-curable ink; and

subsequently exposing the radiation-curable ink to an effective amount of radiation to cure the radiation-curable ink.

58. (New) A method of forming the film of claim 21 comprising:

providing the antifog film;

applying to the antifog film a radiation-curable ink comprising one or more reactants having reactive sites; and

subsequently exposing the radiation-curable ink to electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

59. (New) A method of forming the film of claim 22 comprising:

providing the antifog film;

applying to the antifog film a radiation-curable ink comprising one or more reactants having reactive sites; and

subsequently exposing the radiation-curable ink to electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

60. (New) A method of forming the film of claim 23 comprising:

providing the antifog film;

applying to the antifog film a radiation-curable ink comprising less than 20 % monofunctional monomer based on the weight of the radiation-curable ink; and

subsequently exposing the radiation-curable ink to an effective amount of radiation to cure the radiation-curable ink.

61. (New) A method of forming the film of claim 24 comprising:

providing the antifog film;

applying to the antifog film a radiation-curable ink comprising less than 20 % reactant diluent based on the weight of the radiation-curable ink; and

subsequently exposing the radiation-curable ink to an effective amount of radiation to cure the radiation-curable ink.

62. (New) A method of forming the film of claim 45 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a curable overprint varnish on at least a substantial portion of the printed image, wherein the curable overprint varnish is selected from the group consisting of radiation-curable varnishes and thermoset varnishes; and

subsequently curing the curable varnish to form the cured varnish.

63. (New) A method of forming the film of claim 46 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a radiation-curable overprint varnish on at least a substantial portion of the printed image; and

subsequently exposing the radiation-curable varnish to an effective amount of radiation to cure the radiation-curable varnish.

64. (New) A method of forming the film of claim 47 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a radiation-curable overprint varnish on at least a substantial portion of the printed image; and

subsequently exposing the radiation-curable varnish to an effective amount of radiation to cure the radiation-curable varnish by a free radical mechanism.

65. (New) A method of forming the film of claim 48 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a radiation-curable overprint varnish on at least a substantial portion of the printed image, wherein the radiation-curable varnish comprises one or more reactants having reactive sites; and

subsequently exposing the radiation-curable varnish to electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

66. (New) A method of forming the film of claim 49 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a radiation-curable overprint varnish on at least a substantial portion of the printed image, wherein the radiation-curable varnish comprises one or more reactants having reactive sites; and

subsequently exposing the radiation-curable varnish to electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

67. (New) A method of forming the film of claim 50 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a radiation-curable overprint varnish on at least a substantial portion of the printed image, wherein the radiation-curable varnish comprises less than 20 % monofunctional monomer based on the weight of the radiation-curable varnish; and

subsequently exposing the radiation-curable varnish to an effective amount of radiation to cure the radiation-curable varnish.

68. (New) A method of forming the film of claim 51 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a radiation-curable overprint varnish on at least a substantial portion of the printed image, wherein the radiation-curable varnish comprises less than 20 % reactant diluent based on the weight of the radiation-curable varnish; and

subsequently exposing the radiation-curable varnish to an effective amount of radiation to cure the radiation-curable varnish.

69. (New) The film of claim 41 wherein the cured varnish comprises a radiation-cured varnish.

70. (New) The film of claim 41 wherein:

the antifog film has first and second sides, at least a portion of the first side of the film having an antifogging characteristic;

the printed image is on at least a portion of the second side of the film; and

the overprint varnish comprises an effective amount of cured varnish to reduce ghosting.

71. (New) The film of claim 41 wherein the film comprises an antifog agent dispersed in at least a portion of the film.

72. (New) The film of claim 41 wherein the film comprises an antifog coating on the side of the film opposite the side bearing the printed image.

73. (New) The film of claim 41 wherein the film has a total free shrink at 185°F of at least about 5%.

74. (New) The film of claim 41 wherein the cured varnish comprises a radiation-cured varnish.

75. (New) The film of claim 41 wherein the cured varnish comprises an electron-beam cured varnish.

76. (New) The film of claim 41 wherein the cured varnish comprises an ultraviolet-light cured varnish.

77. (New) The film of claim 41 wherein the cured varnish comprises a thermoset varnish.

78. (New) The film of claim 41 wherein the cured varnish comprises a cured one-component reactive varnish.

79. (New) The film of claim 41 wherein the cured varnish comprises a cured multi-component reactive varnish.

80. (New) The film of claim 41 wherein the cured varnish comprises a cured two-component reactive varnish.

81. (New) The film of claim 41 wherein the cured varnish comprises a thermoset melamine-based varnish.

82. (New) The film of claim 41 wherein the cured varnish comprises a thermoset urethane-based varnish.

83. (New) The film of claim 54 wherein the film comprises an antifog agent dispersed in at least a portion of the film.

84. (New) The film of claim 54 wherein the film comprises an antifog coating on the side of the film opposite the side bearing the printed image.

85. (New) The film of claim 54 wherein the film has a total free shrink at 185°F of at least about 5%.

86. (New) The film of claim 54 wherein the varnish comprises a radiation-curable varnish.

87. (New) The film of claim 54 wherein the varnish comprises a curable thermoset varnish.

88. (New) The film of claim 54 wherein the varnish comprises an electron-beam curable varnish.

89. (New) The film of claim 54 wherein the varnish comprises an ultraviolet-light curable varnish.

90. (New) The film of claim 54 wherein the varnish comprises a curable one-component reactive varnish.

91. (New) The film of claim 54 wherein the varnish comprises a curable multi-component reactive varnish.

92. (New) The film of claim 54 wherein the varnish comprises a curable two-component reactive varnish.

93. (New) The film of claim 54 wherein the varnish comprises a curable thermoset melamine-based varnish.

94. (New) The film of claim 54 wherein the varnish comprises a curable thermoset urethane-based varnish.

95. (New) The method of claim 55 wherein the overprint varnish comprises a radiation-curable varnish.

96. (New) The method of claim 55 wherein the overprint varnish comprises a curable thermoset varnish.

97. (New) The method of claim 55 wherein the curing comprises exposing the varnish to an effective amount of radiation to cure the varnish by a free radical mechanism.

98. (New) The method of claim 55 wherein:

the overprint varnish comprises a radiation-curable varnish comprising one or more reactants having reactive sites; and

the curing comprises exposing the radiation-curable varnish to electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

99. (New) The method of claim 55 wherein:

the overprint varnish comprises a radiation-curable overprint varnish comprising one or more reactants having reactive sites; and

the curing comprises exposing the radiation-curable varnish to electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

100. (New) The method of claim 55 wherein:

the overprint varnish comprises a radiation-curable varnish comprising less than 20 % monofunctional monomer based on the weight of the radiation-curable varnish; and

the curing comprises exposing the radiation-curable varnish to an effective amount of radiation to cure the radiation-curable varnish.

101. (New) The method of claim 55 wherein:

the overprint varnish comprises a radiation-curable varnish comprising less than 20 % reactant diluent based on the weight of the radiation-curable varnish; and

the curing comprises exposing the radiation-curable varnish to an effective amount of radiation to cure the radiation-curable varnish.

102. (New) The method of claim 55 wherein the antifog film comprises an antifog agent dispersed in at least a portion of the antifog film.

103. (New) The method of claim 55 wherein the antifog film comprises an antifog coating on the side of the film opposite the side bearing the printed image.

104. (New) The method of claim 55 wherein antifog film has a total free shrink at 185°F of at least about 5%.

105. (New) The method of claim 55 wherein the overprint cured comprises an electron-beam curable varnish.

106. (New) The method of claim 55 wherein the overprint varnish comprises an ultraviolet-light curable varnish.